



Mākaha Valley Flood Study

Community Meeting No. 2
September 23, 2014



TOWNSCAPE, INC.
Environmental & Community Planning

- Report is available at:
<http://dlnreng.hawaii.gov/fcds/?p=493>

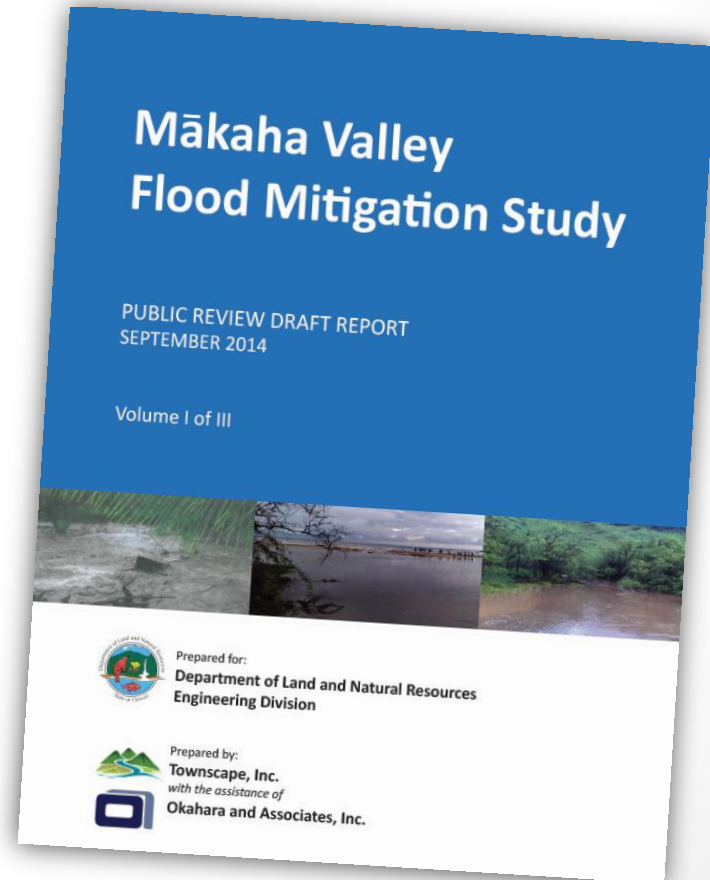
- Send comments by:

October 15th

Email:

bruce@townscapeinc.com

gabrielle@townscapeinc.com





Agenda

- Project Background
- Existing conditions in Mākaha
- Recommended Flood Mitigation Measures
- Cost Estimates
- Prioritization of Projects
- Next steps

Project Background

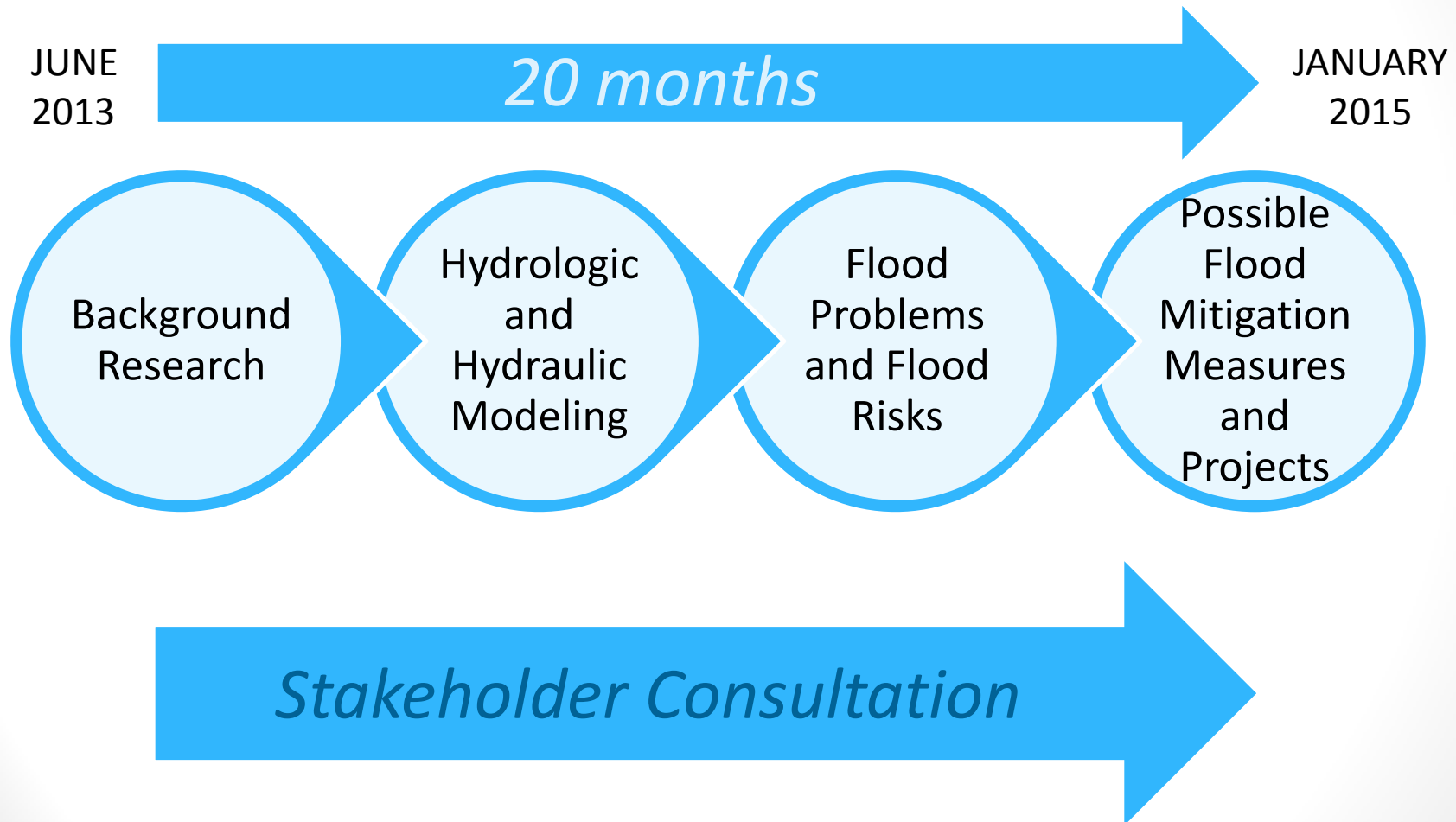
- Funded by House Bill No. 2883 in 2012
- Appropriated \$500,000 for flood study

“The purpose of this Act is to require the Department of Land and Natural Resources to conduct a flood study for Mākaha Valley and investigate all potential funding sources to finance the flood study and any improvements or repairs as recommended by the flood study.”

- Contracted Townscape, Inc. to conduct flood study
 - Subconsultants: Okahara and Associates



Project Scope and Schedule



Our Stakeholder Outreach Process

Community

- Community members
- Land owners
- Businesses

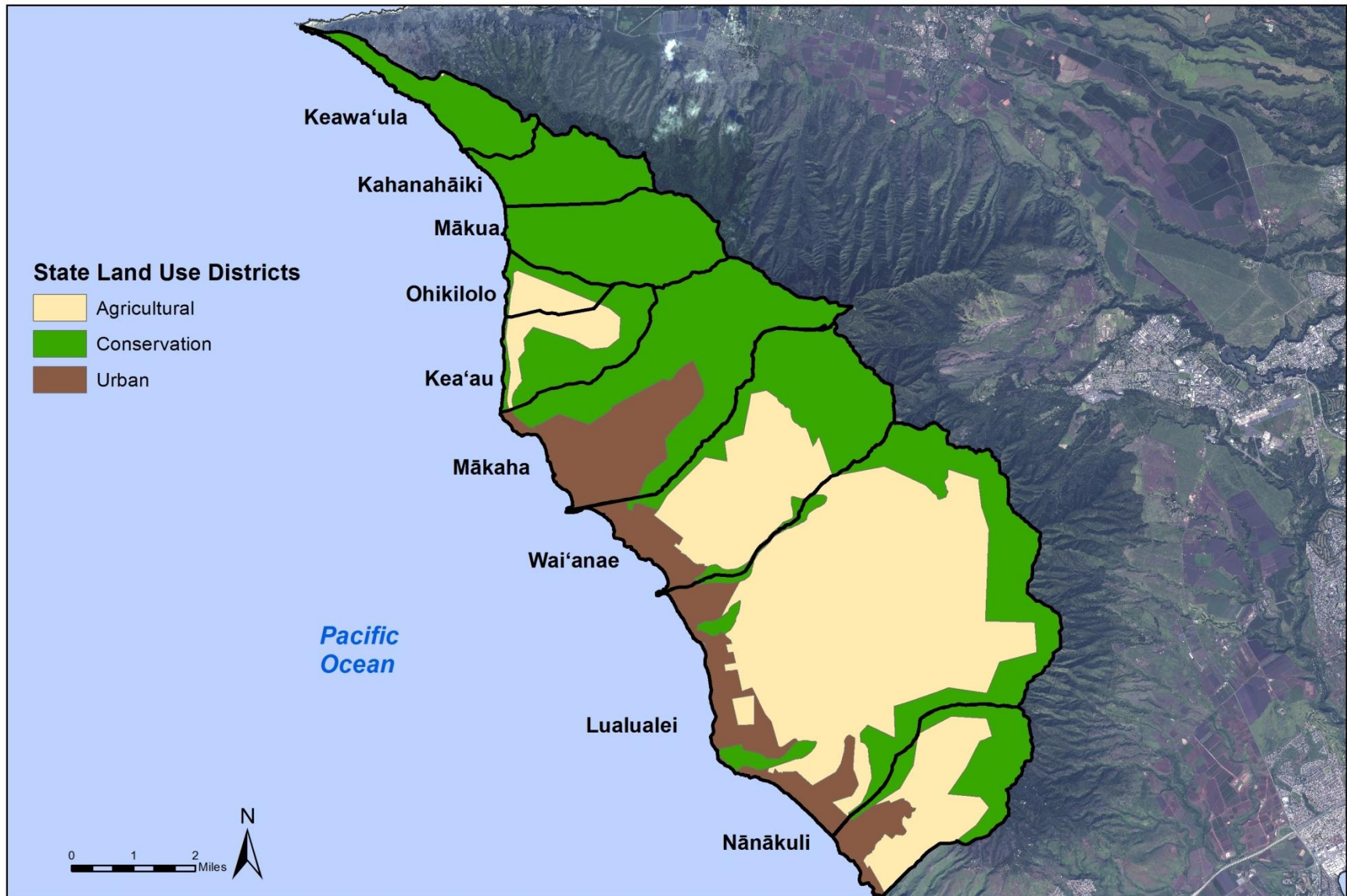
Public Agencies

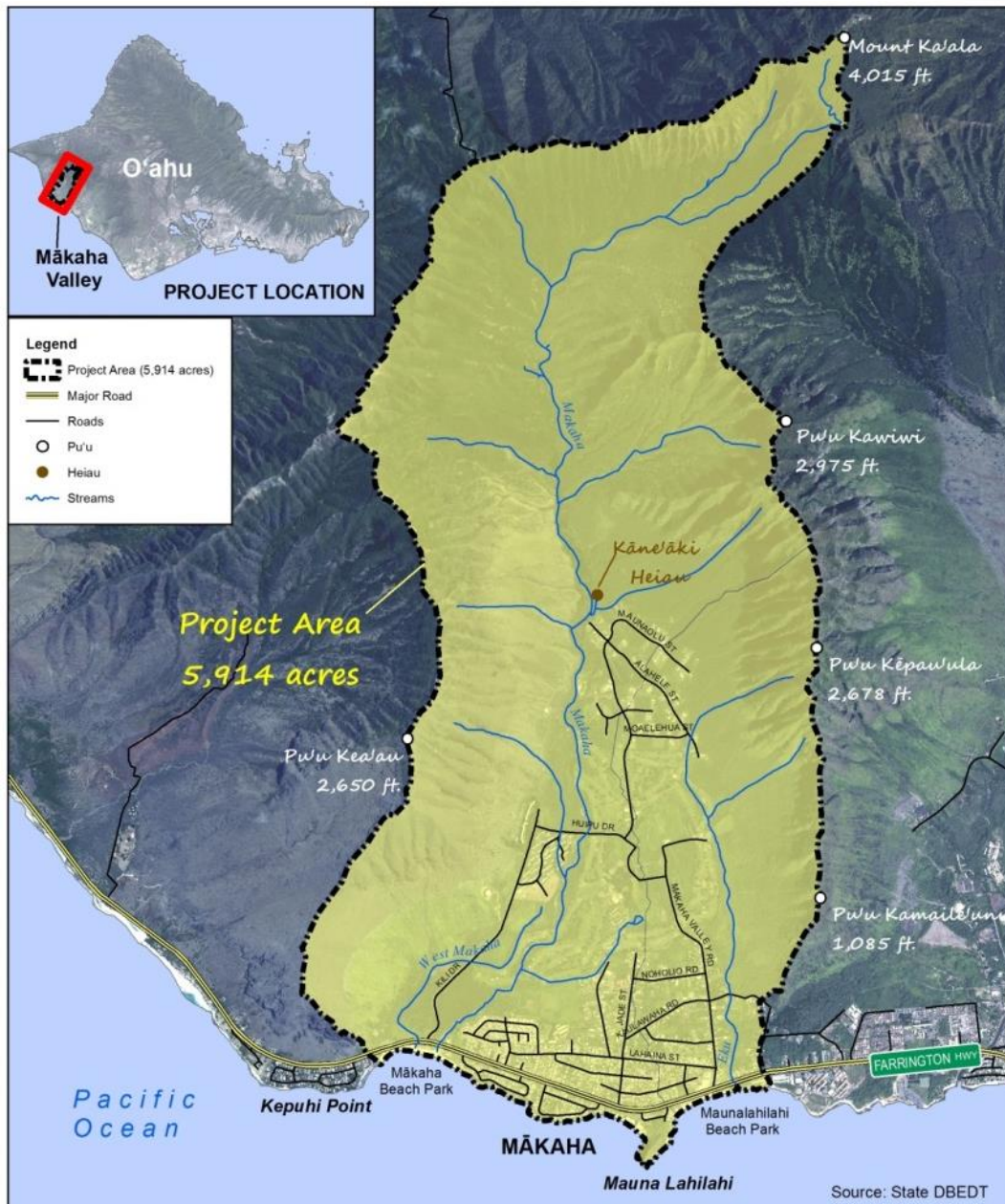
- State Department of Transportation
- State Civil Defense
- City DPP Drainage, DPR, DFM
- Board of Water Supply

Elected Officials

- Representative Jo Jordan
- Senator Maile Shimabukuro

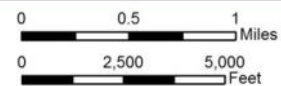
State Land Use Districts





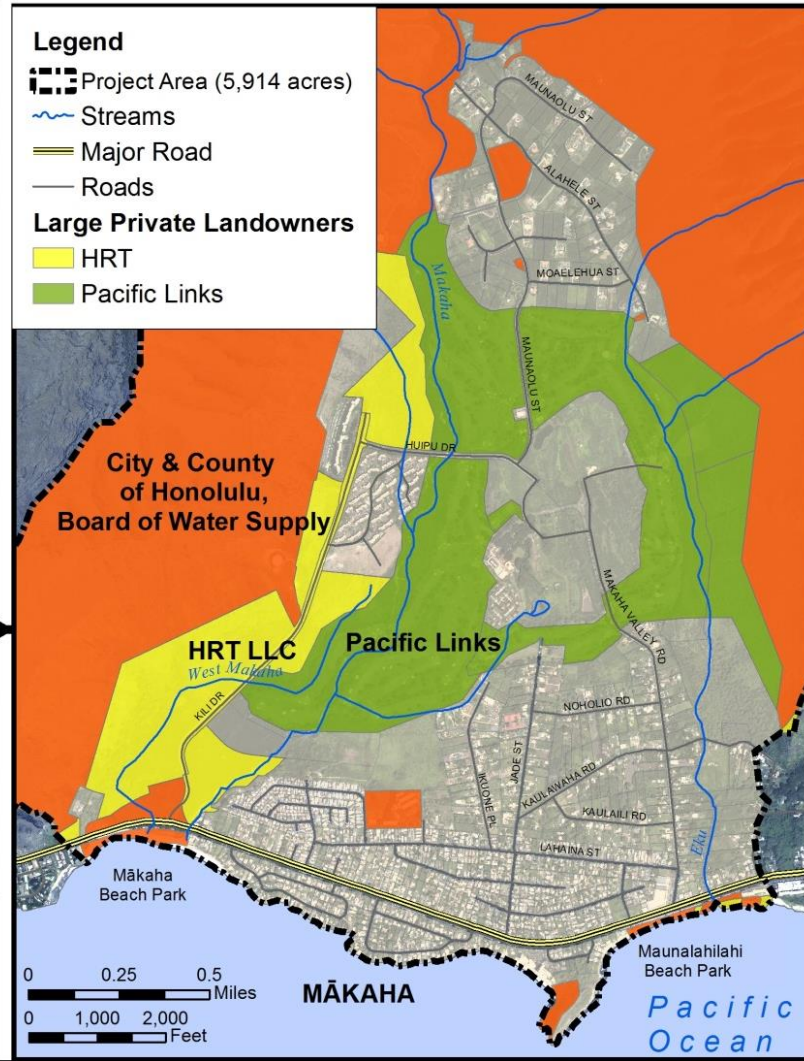
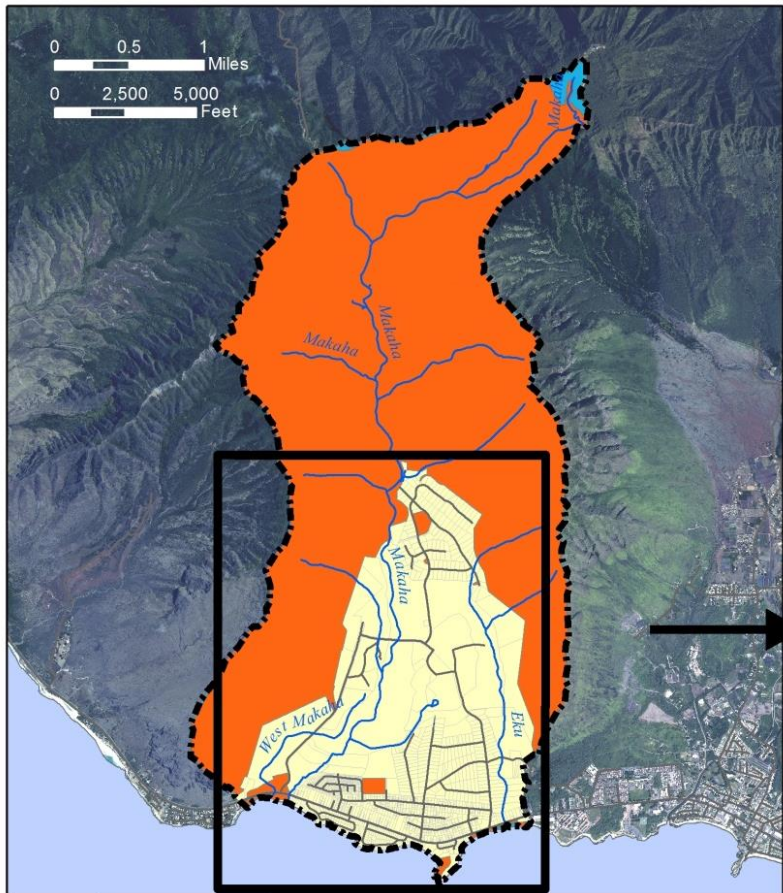
Mākaha Valley Flood Study

PROJECT AREA



By: Townscape, Inc. For: Hawaii State DLNR Date: January 2014

Landowners



Mākaha Valley Flood Study

LARGE LANDOWNERS

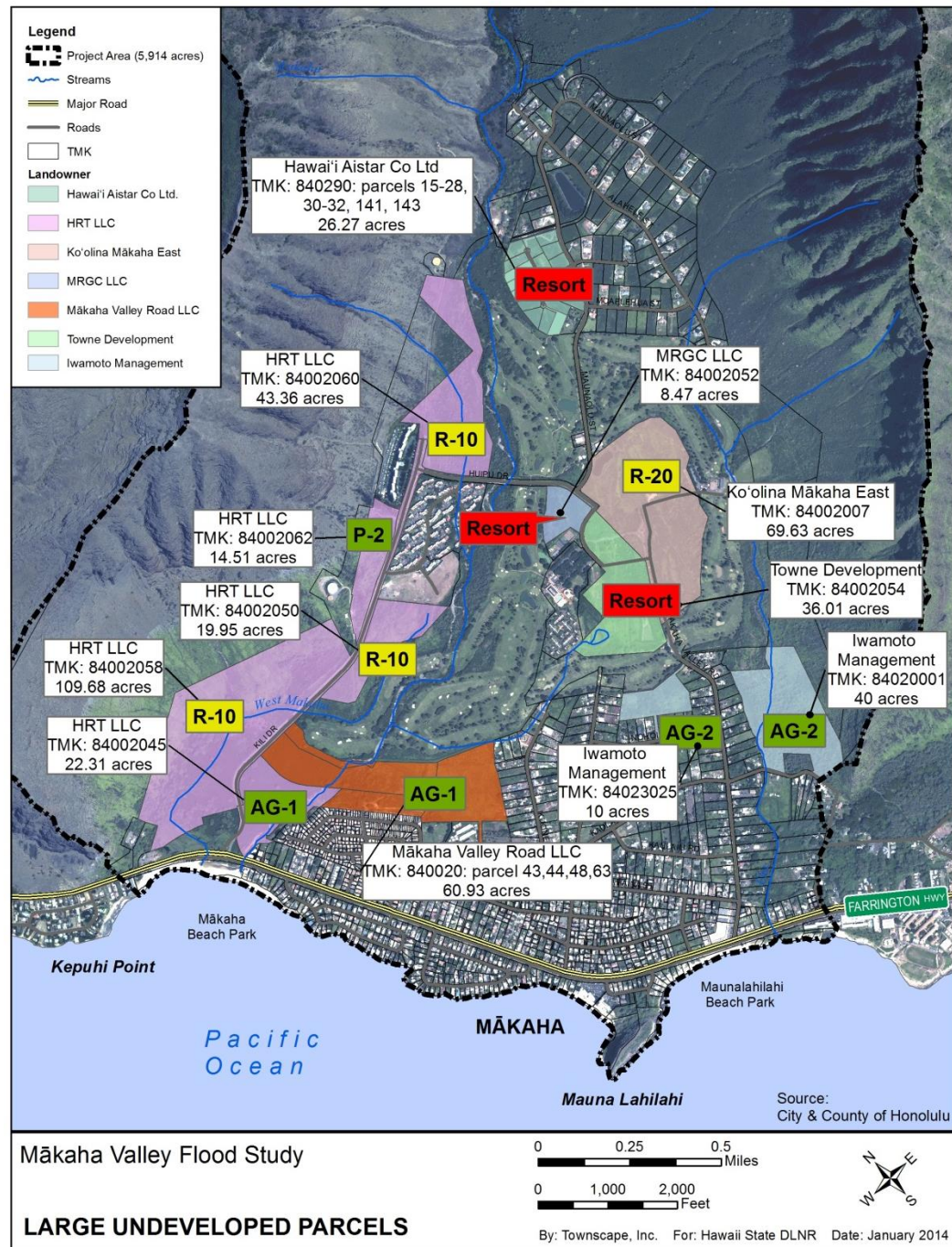
Source: City & County of Honolulu

By: Townscape, Inc. For: Hawaii State DLNR Date: March 2014



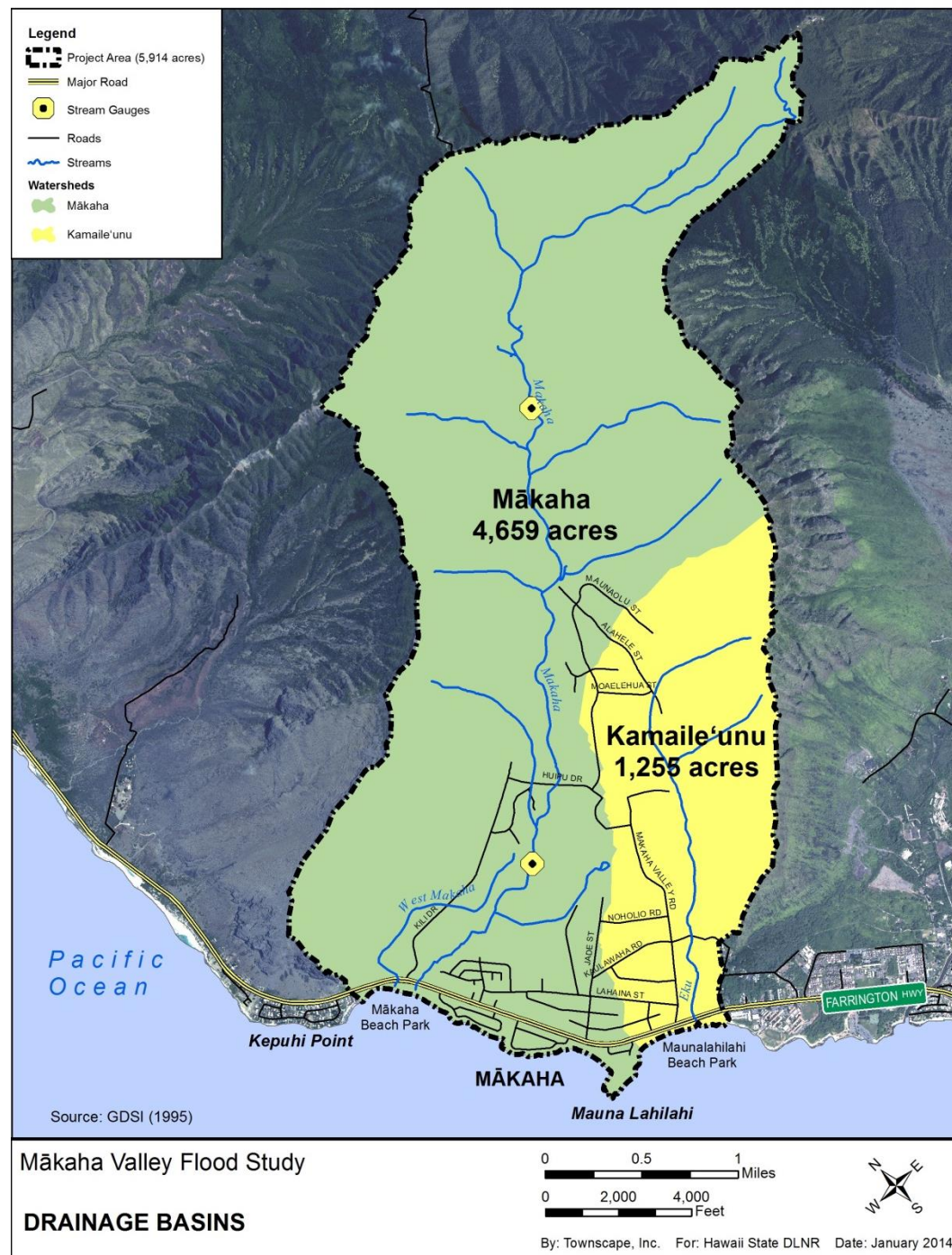
Large Undeveloped Parcels

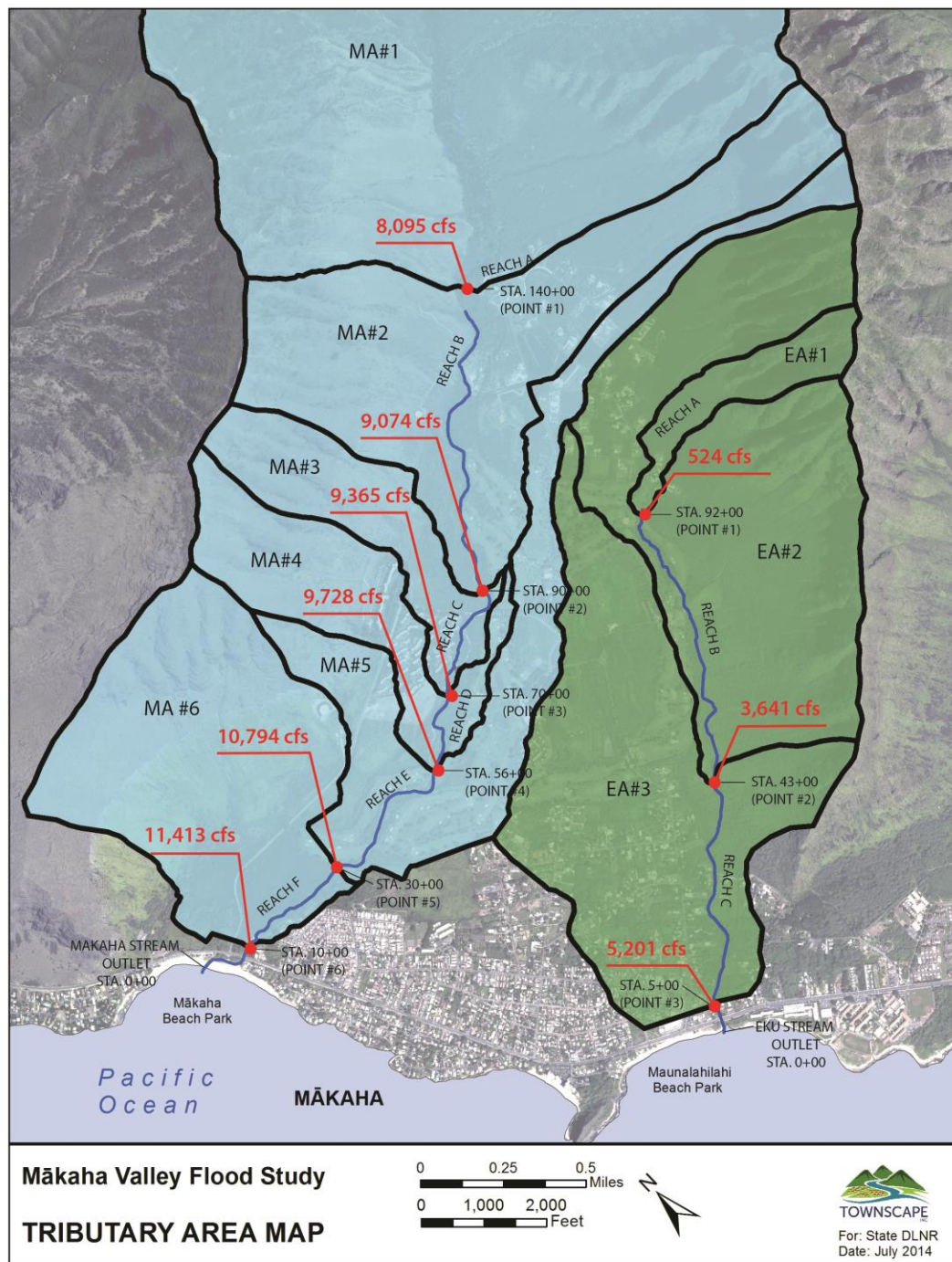
- 13+ large undeveloped parcels
- Total 462 acres
- Zoning could allow for single family homes, hotels, duplex units, recreational facilities

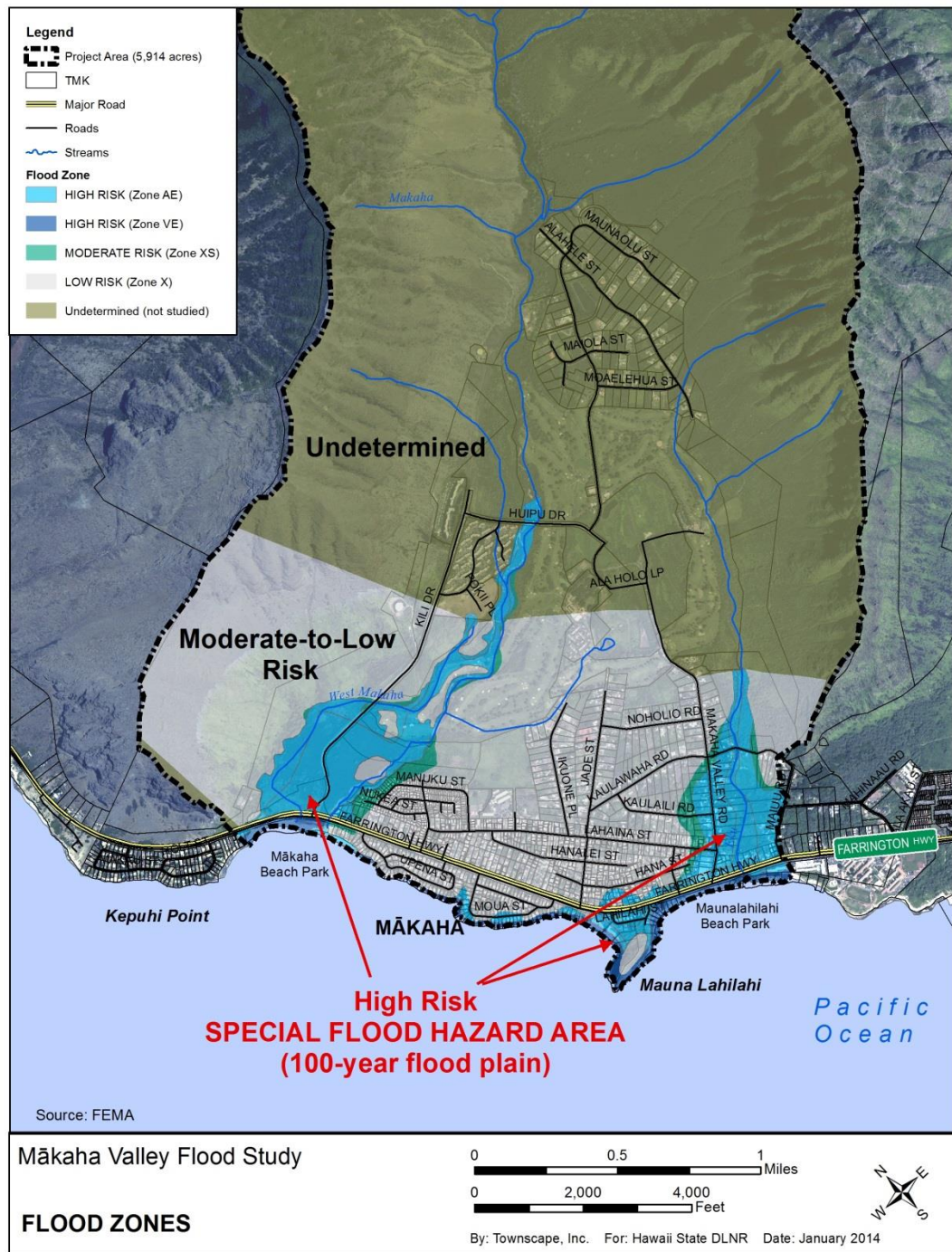


Drainage Basins

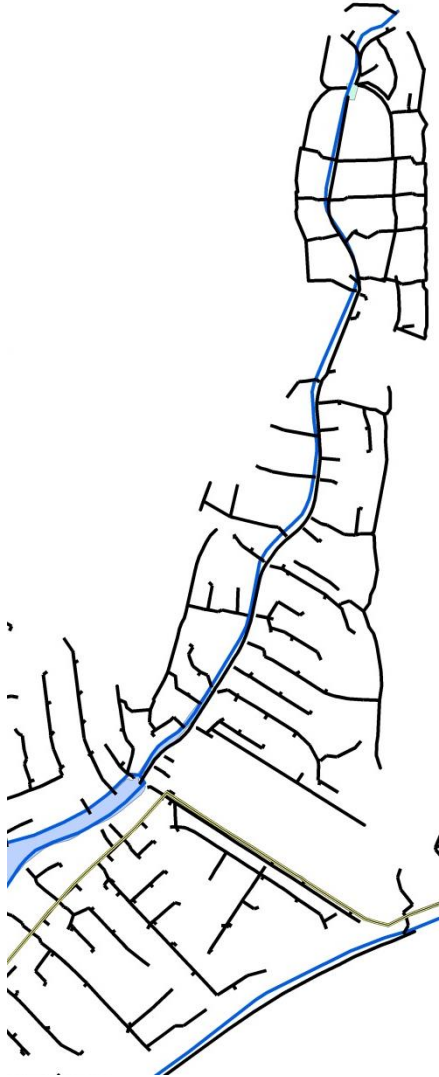
- 75% of the valley drains into Mākaha Stream
- 25% of the valley drains into Eku Stream



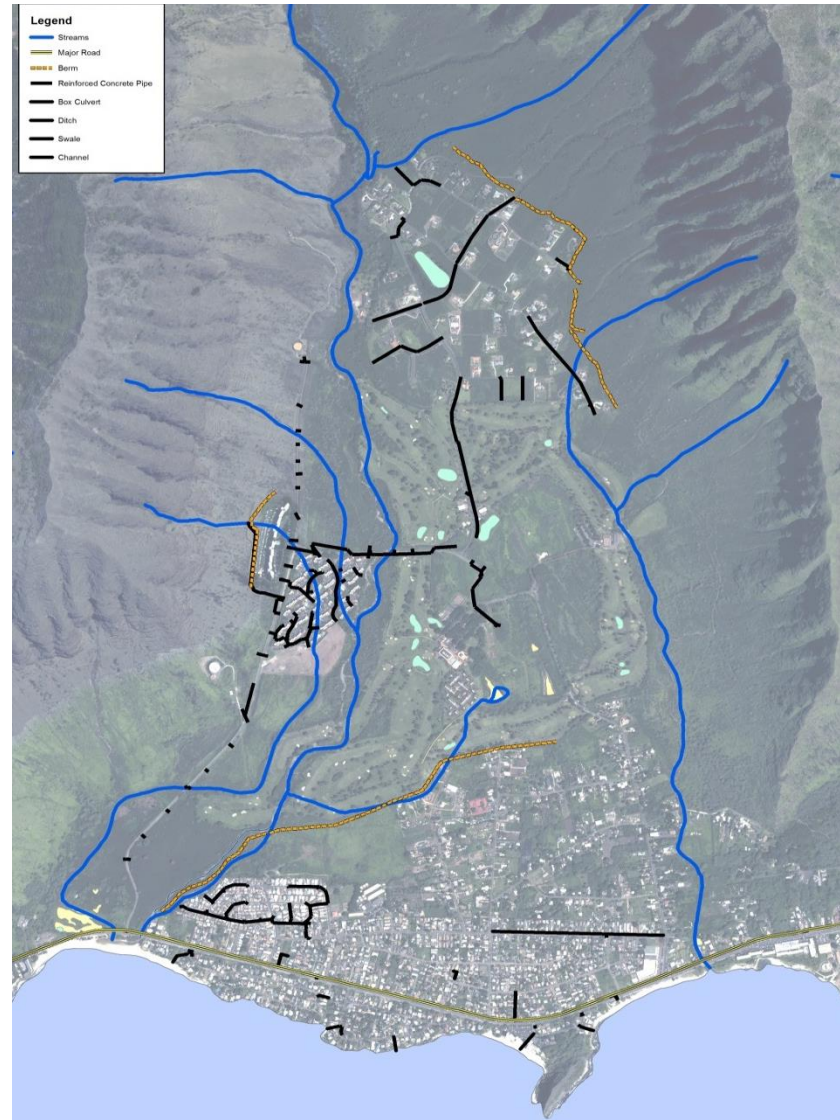




Example of “Well-Planned” Drainage System

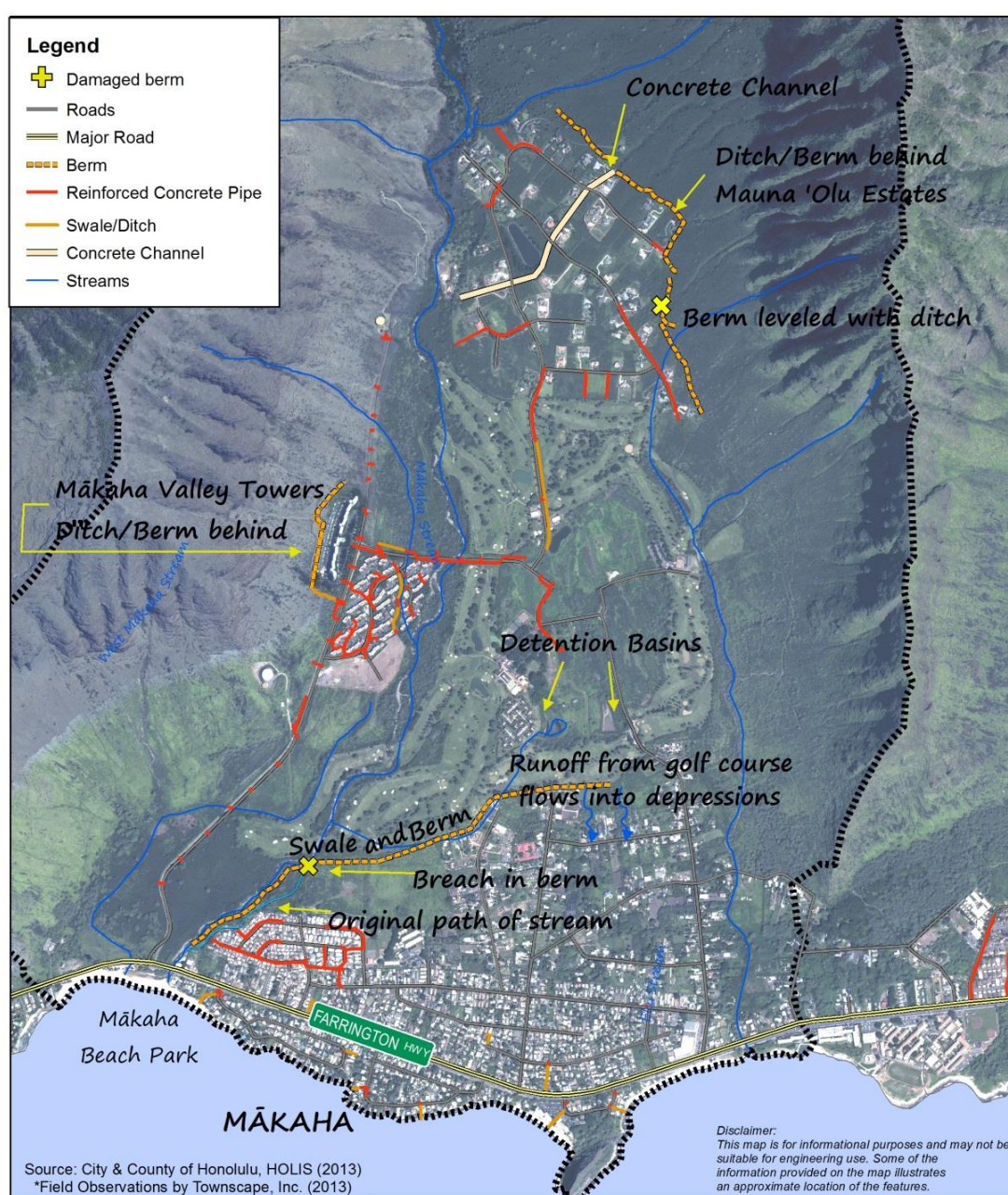


Mākaha Valley Current Drainage System: “Piece-meal”



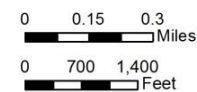
Legend

-  Damaged berm
-  Roads
-  Major Road
-  Berm
-  Reinforced Concrete Pipe
-  Swale/Ditch
-  Concrete Channel
-  Streams



Mākaha Valley Flood Study

EXISTING DRAINAGE SYSTEMS



Legend

 Project Area (5,914 acres)

 Streams

 Berm

 Tax Map Key

City Zoning

 A-1 Low-density Apartment District

 A-2 Medium-density Apartment District

 AG-1 Restricted Agriculture District

 AG-2 General Agriculture District

 B-2 Community Business District

 Country District

 P-1 Restricted Preservation District

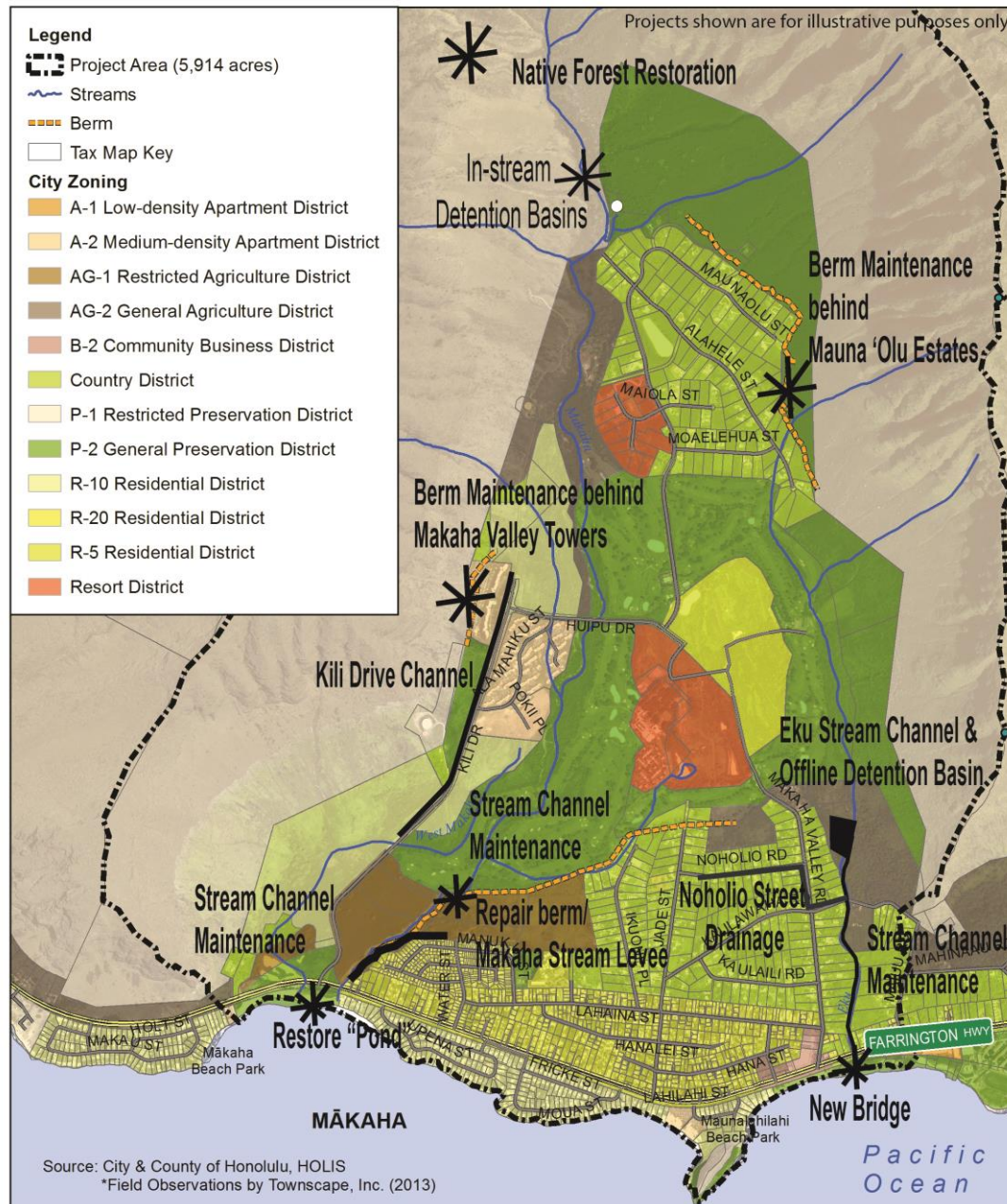
 P-2 General Preservation District

 R-10 Residential District

 R-20 Residential District

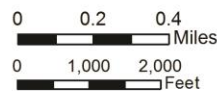
 R-5 Residential District

 Resort District

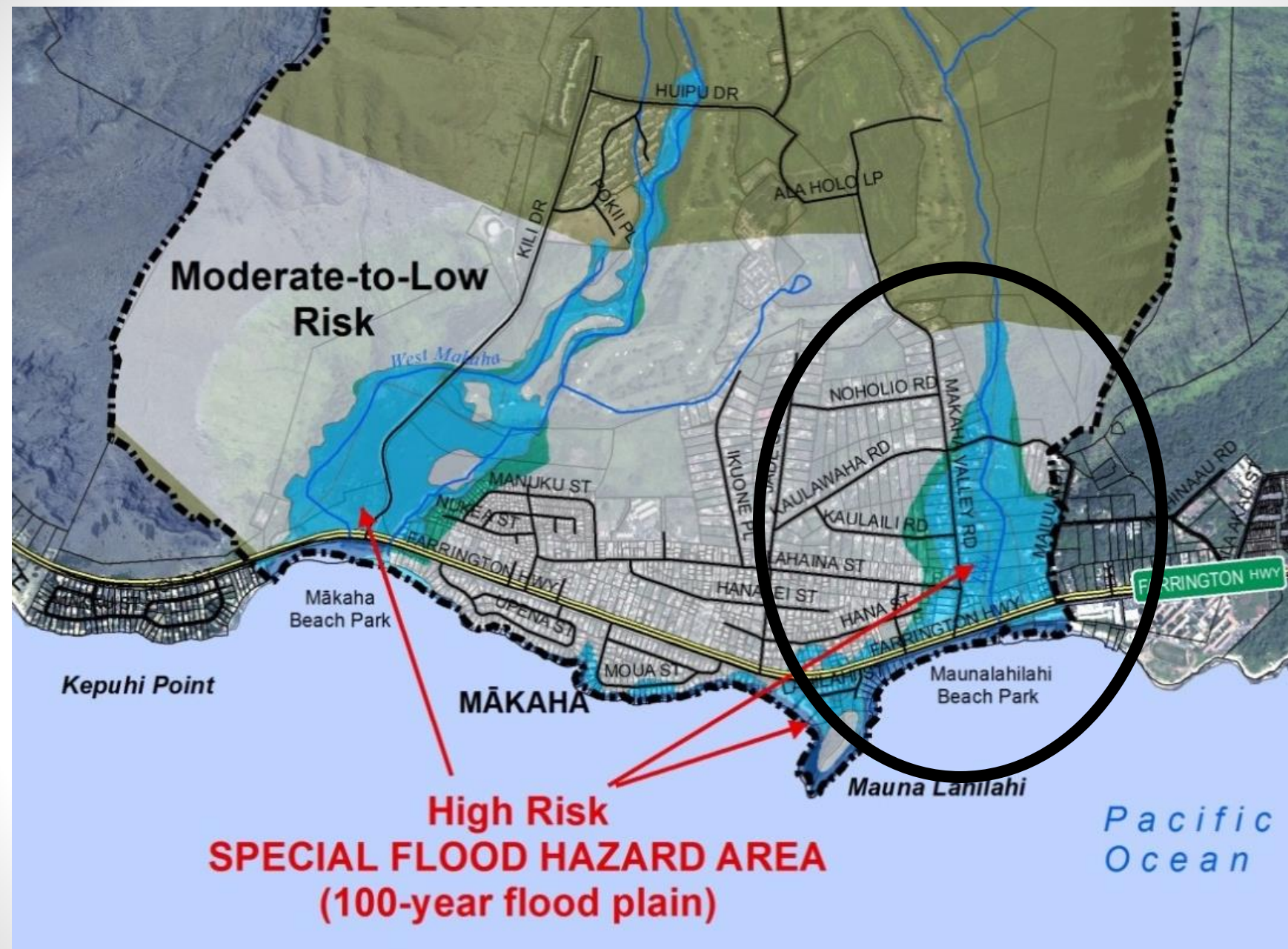


Mākaha Valley Flood Study

FLOOD MITIGATION PROJECTS

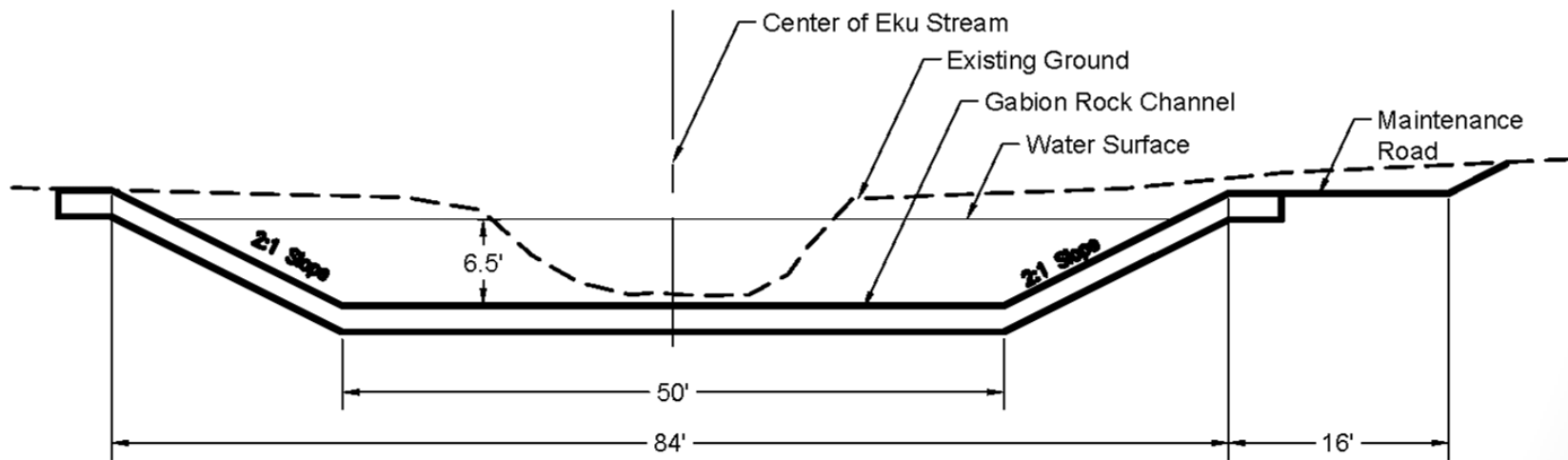



TOWNSCAPE
For: State DLNR
Date: July 2014



Project No.01:

Eku Stream Channel and Off-line Detention Basin



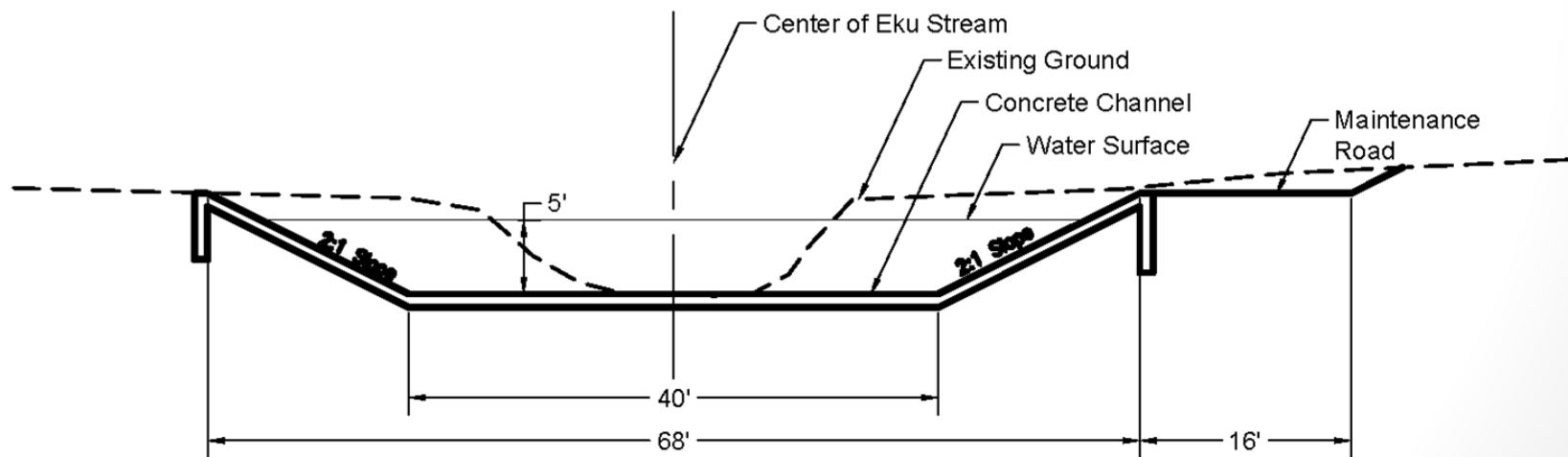
Eku Stream - Gabion Rock Channel

Looking Makai



Project No.01:

Eku Stream Channel and Off-line Detention Basin

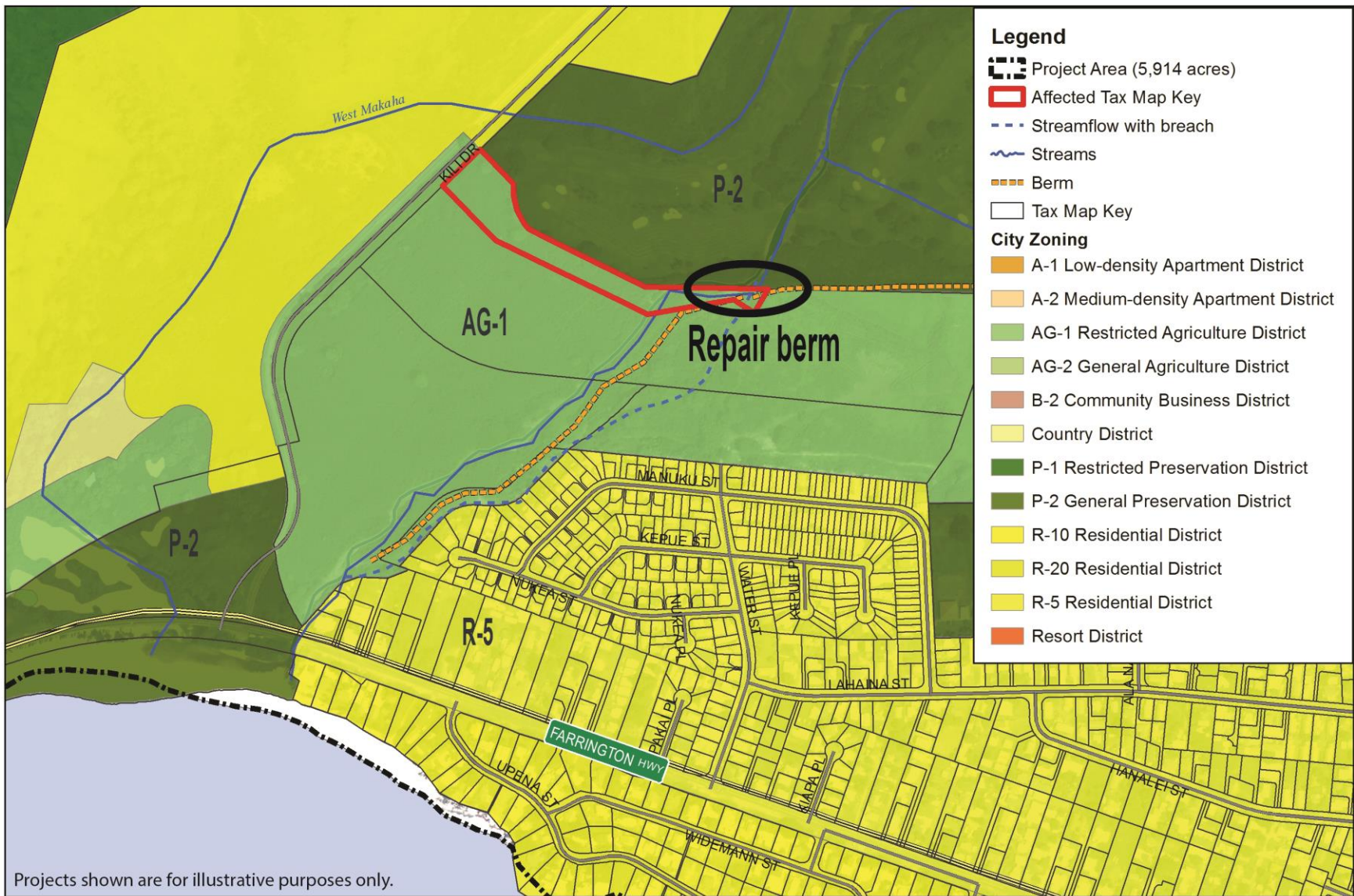


Eku Stream - Concrete Channel

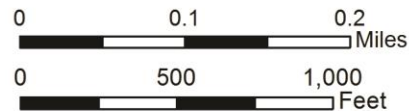
Looking Makai

Project No. 02: New Eku Stream Bridge at Farrington Highway

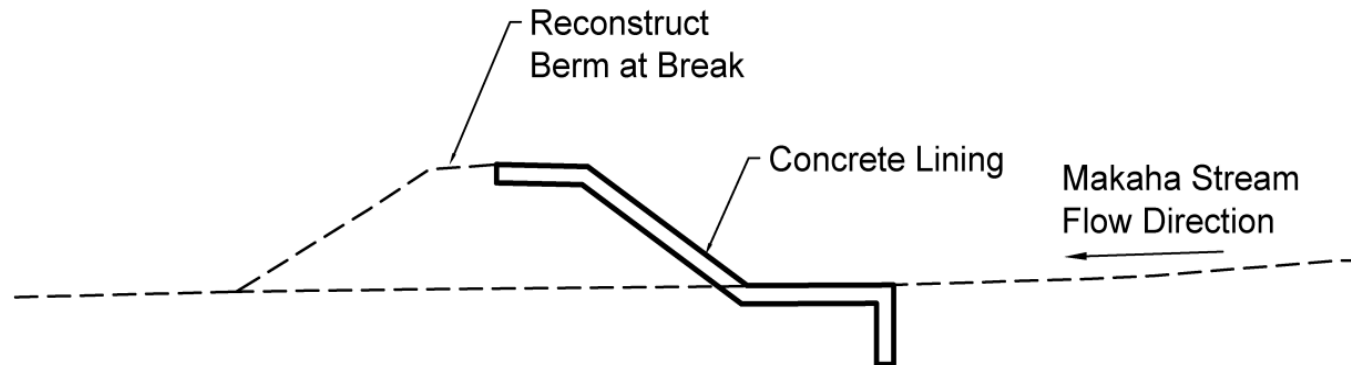




Mākaha Valley Flood Study FLOOD MITIGATION PROJECTS

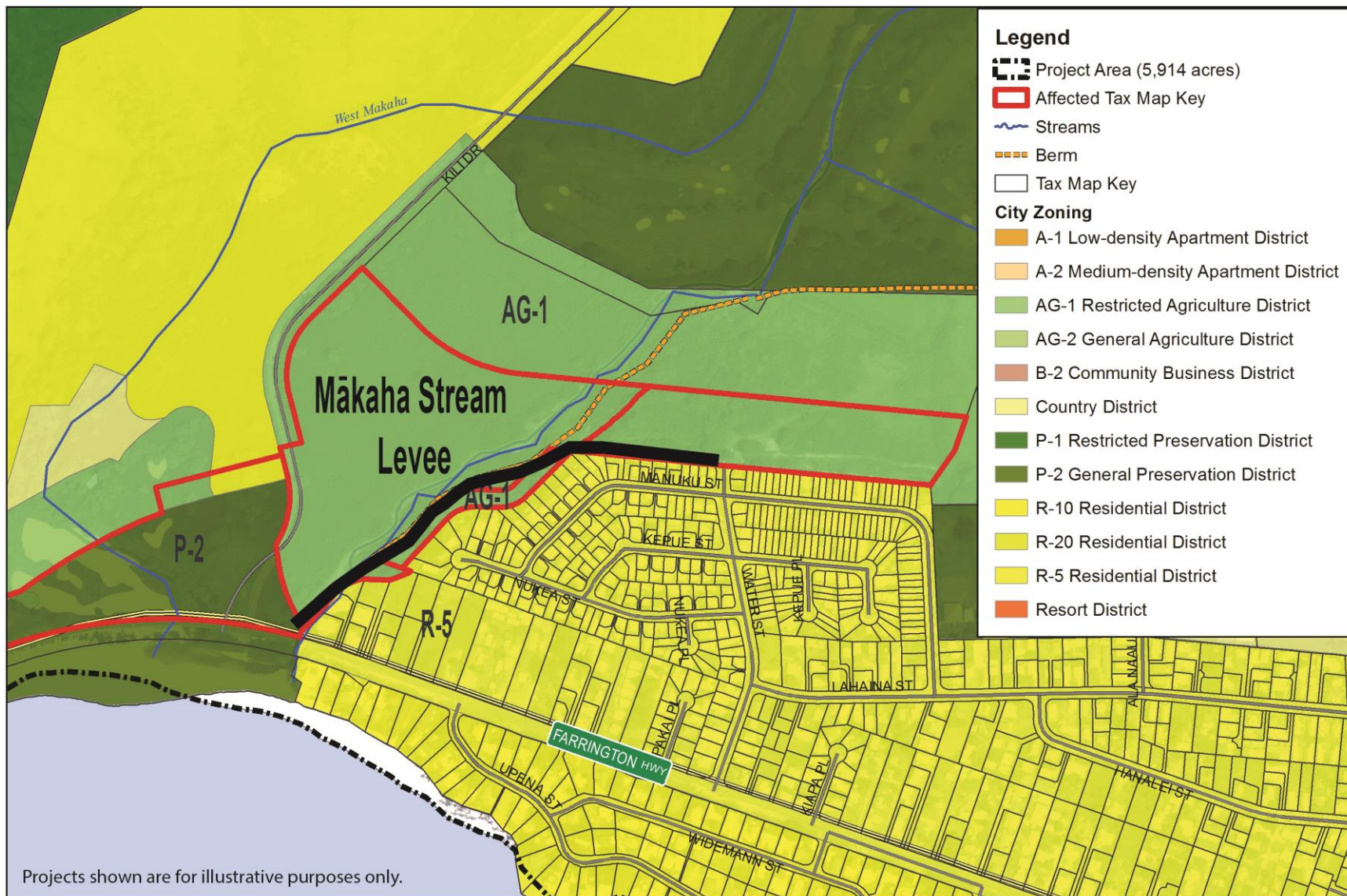


Project No. 03: Repair the Breach in the Mākaha Stream berm

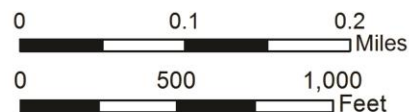


Repair Makaha Stream Berm

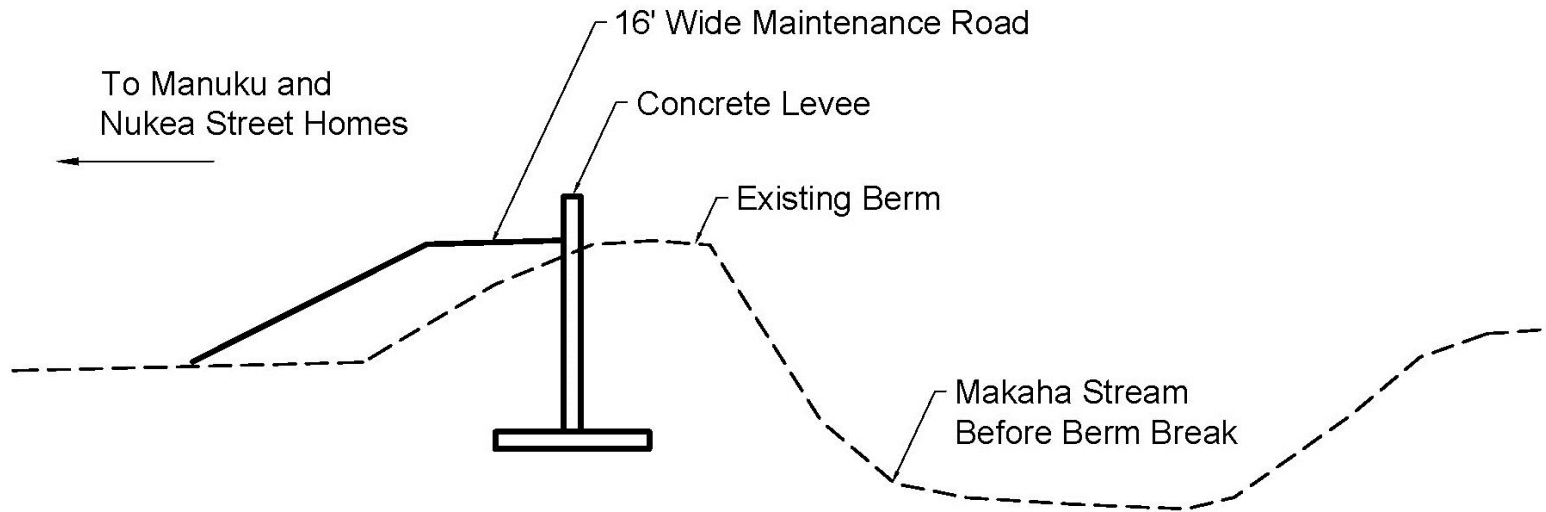
Looking Westerly



Mākaha Valley Flood Study FLOOD MITIGATION PROJECTS



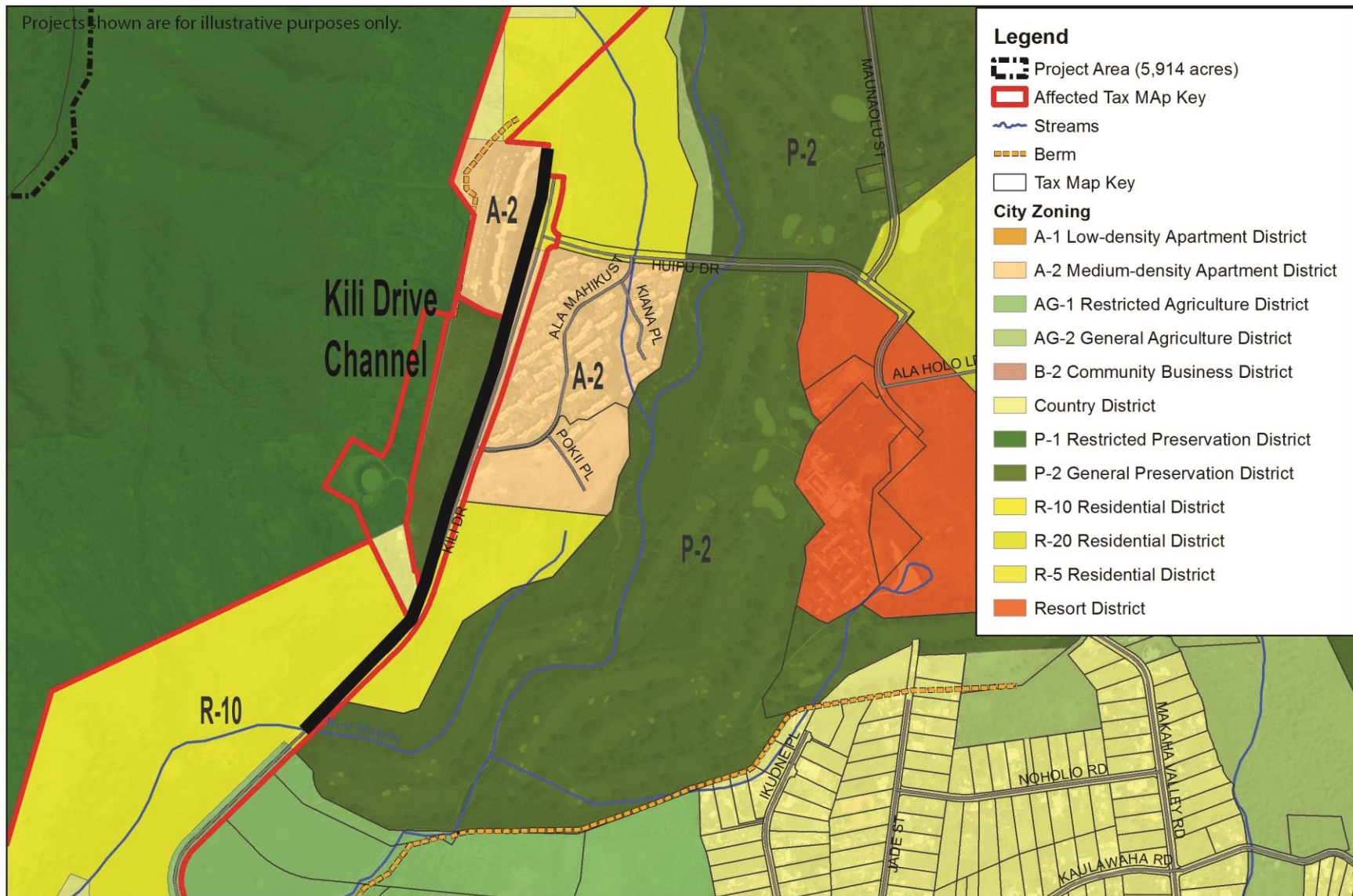
Project No. 04: Mākaha Stream Levee



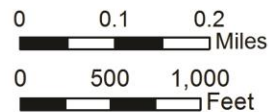
Makaha Stream Levee

Looking Makai

Projects shown are for illustrative purposes only.

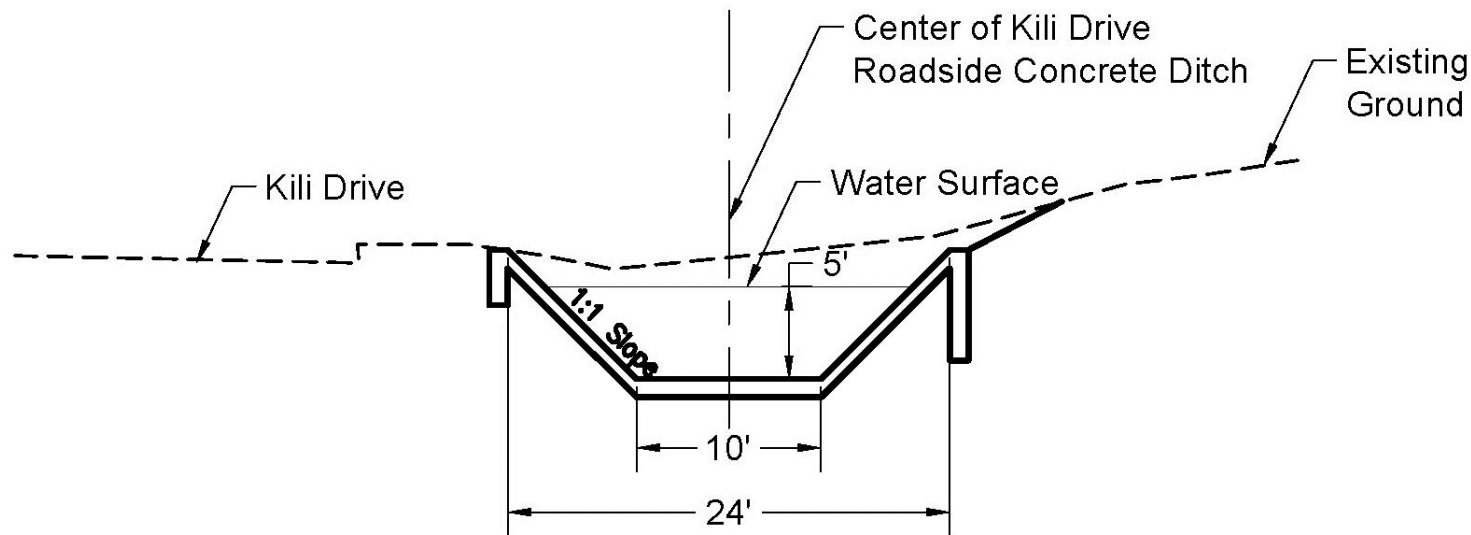


Mākaha Valley Flood Study FLOOD MITIGATION PROJECTS



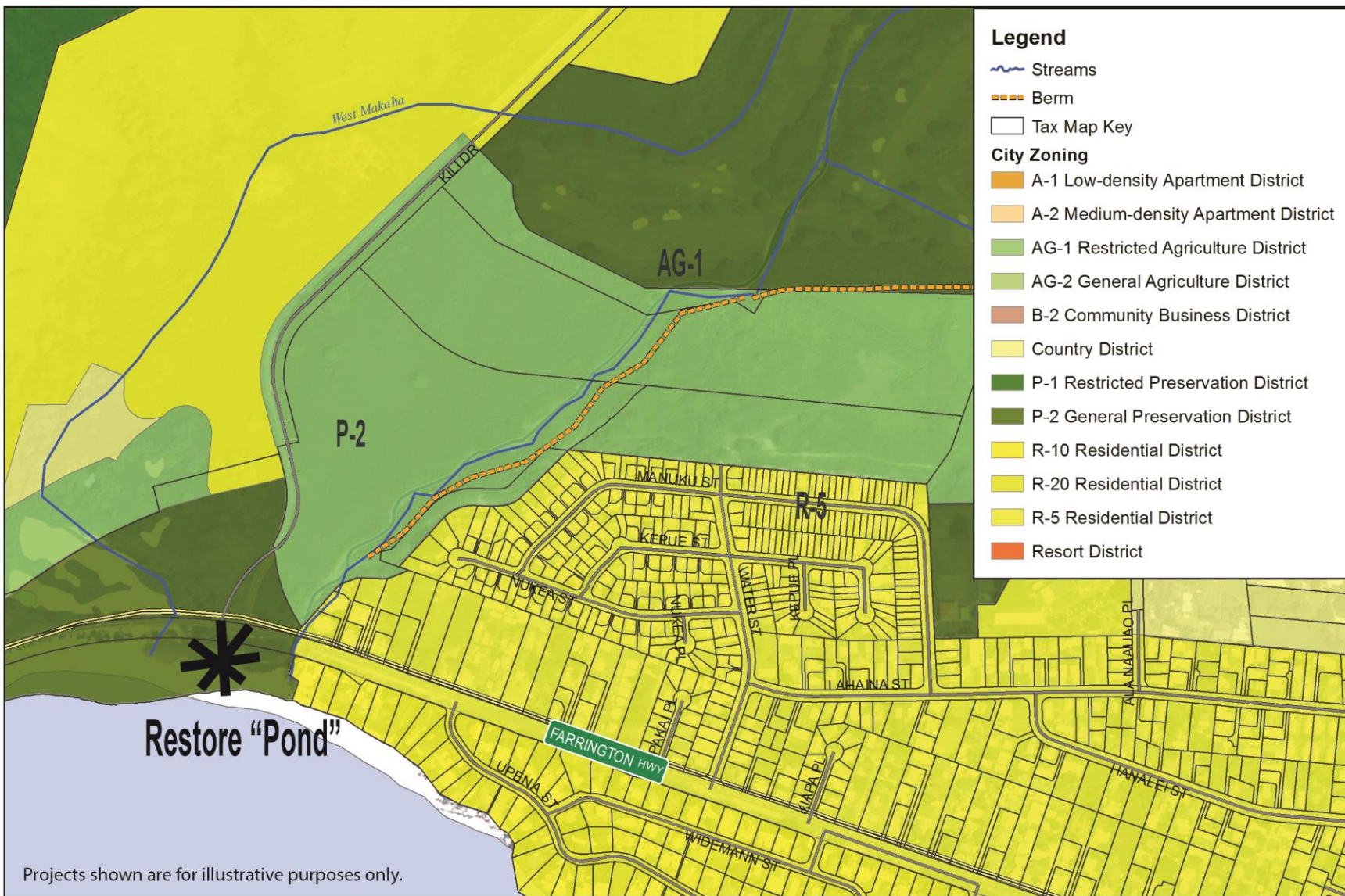
Project No. 05:

Kili Drive Channel



Kili Drive - Concrete Channel

Looking Makai



Mākaha Valley Flood Study
FLOOD MITIGATION PROJECTS

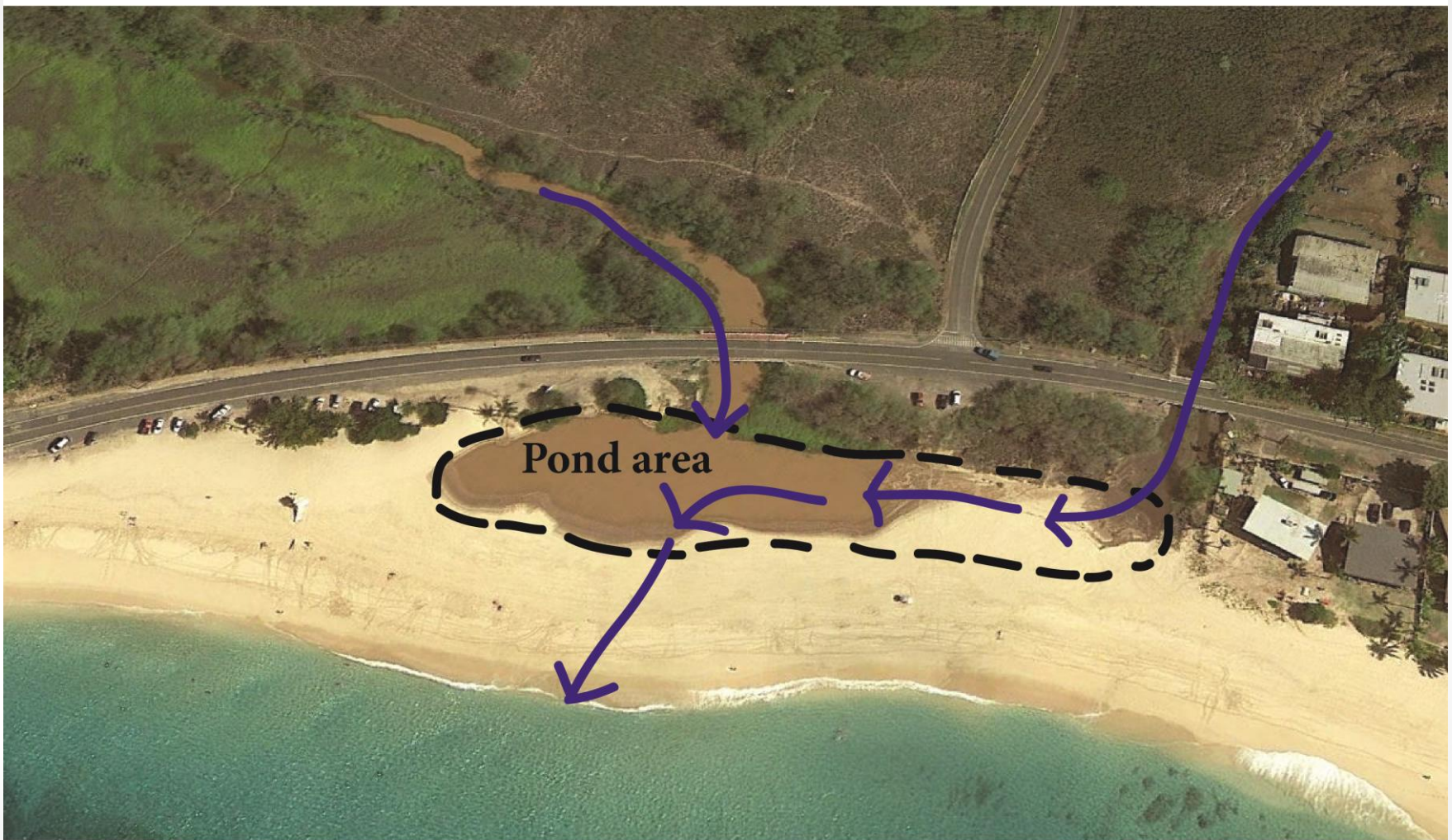


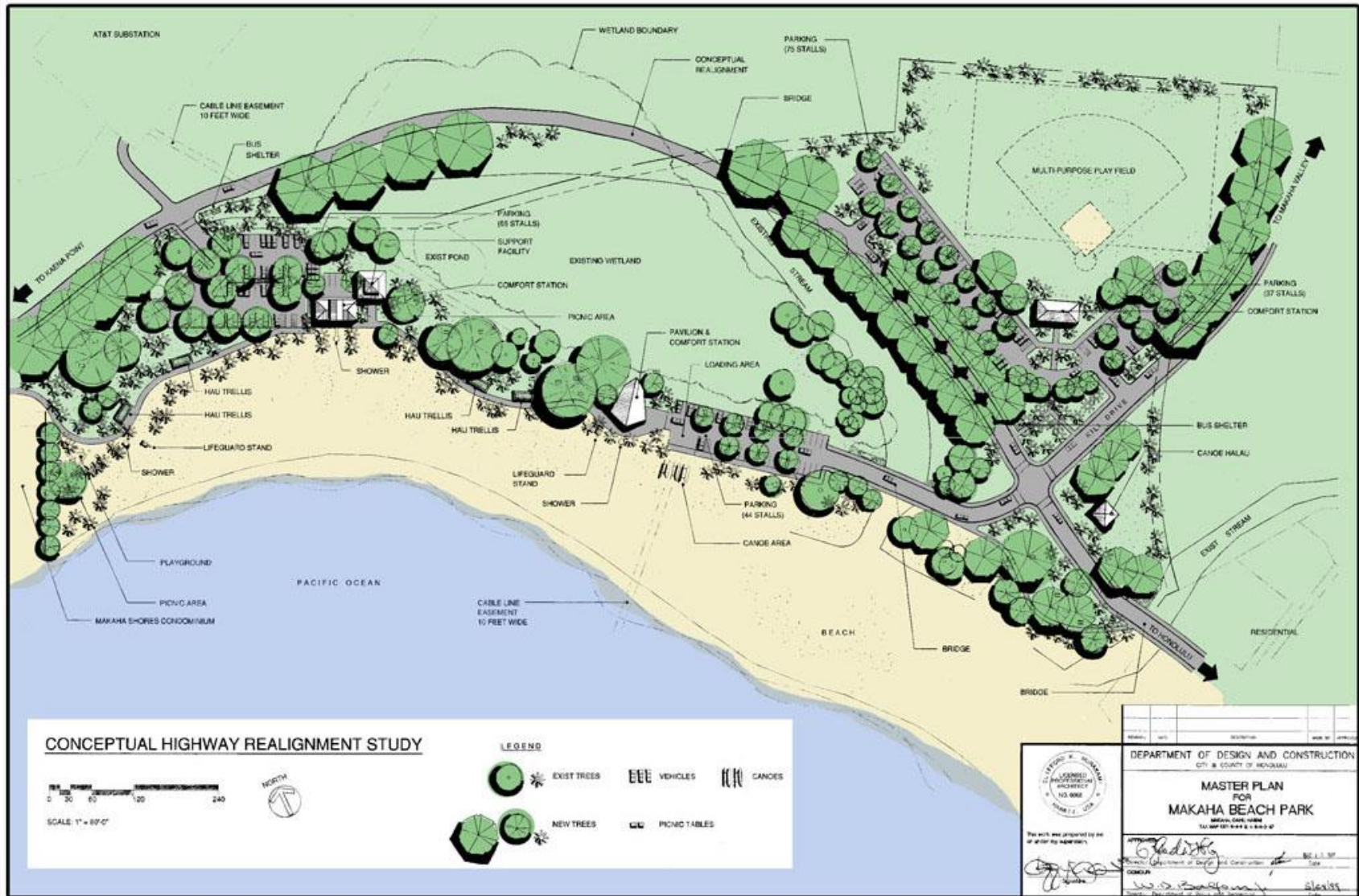
Project No. 06:

Restore Mākaha Surfing Beach “Pond”









Stream Channel Maintenance



Storm Drain Maintenance



Forest Restoration



- Infiltration rates 2X greater
 - 2/3 of valley is forested areas
 - Long-range project
-
- ✓ \$500,000 GIA
 - ✓ \$250,000 BWS
 - ✓ \$250,000-\$500,000 NRCS grant application

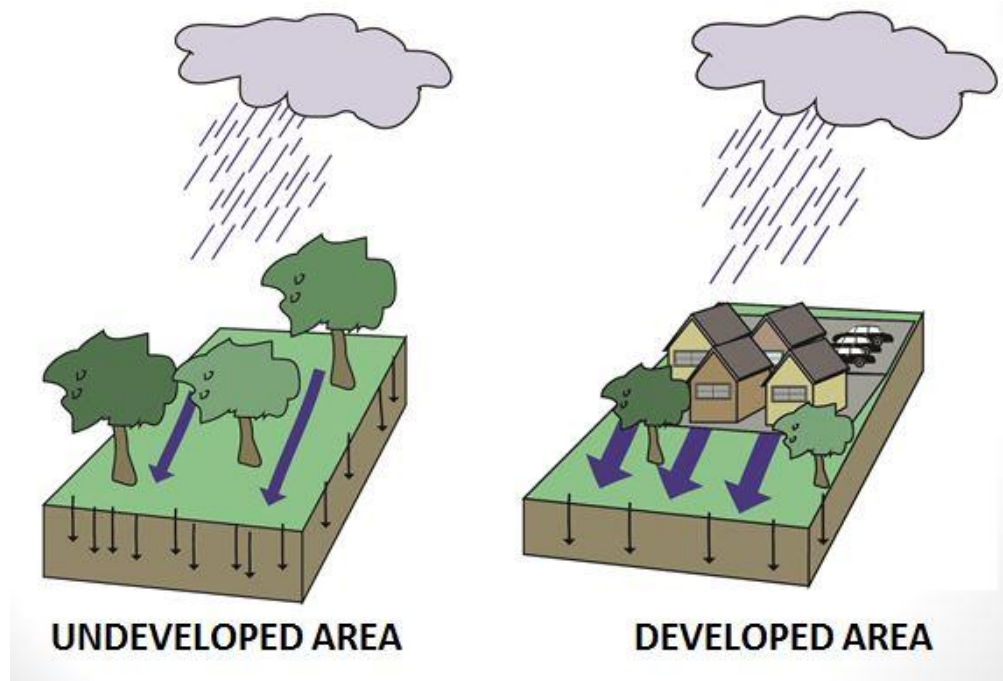
Other Non-Structural Measures

- **Enforcement of existing legislation**
 - **ROH Chapter 41, Article 26:** Maintenance of streams → Owner is responsible to maintain stream
 - **ROH Chapter 29, Article 4:** Litter Control → Illegal to litter in any stream



Other Non-Structural Measures

- **Drainage Improvements required for future development**
 - Any future development of zoned/undeveloped parcels should include a combination of on-site storm runoff detention and improvement of downstream drainage systems



Cost Estimates

	Mitigation Measure	Total Estimated Cost*
1	Eku Stream Channel and Off-line Detention Basin	\$27.8M- \$34.8M
2	Mākaha Stream Levee	\$17M-\$24M
3	New Eku Stream Bridge at Farrington Highway	\$12M-\$19M
4	Kili Drive Channel	\$12M-\$19M
5	Repair the breach in the Mākaha Stream berm	\$1.7M-\$3.3M
6	Noholio Road Drain Line	\$1.7M-\$3.3M
7	Restore Mākaha Surfing Beach “Pond”	To be determined
8	In-stream Detention Basins for Mākaha Stream	To be determined

* Includes land acquisition, easements, environmental fees, survey and design, construction management, and construction costs

Prioritization of Projects

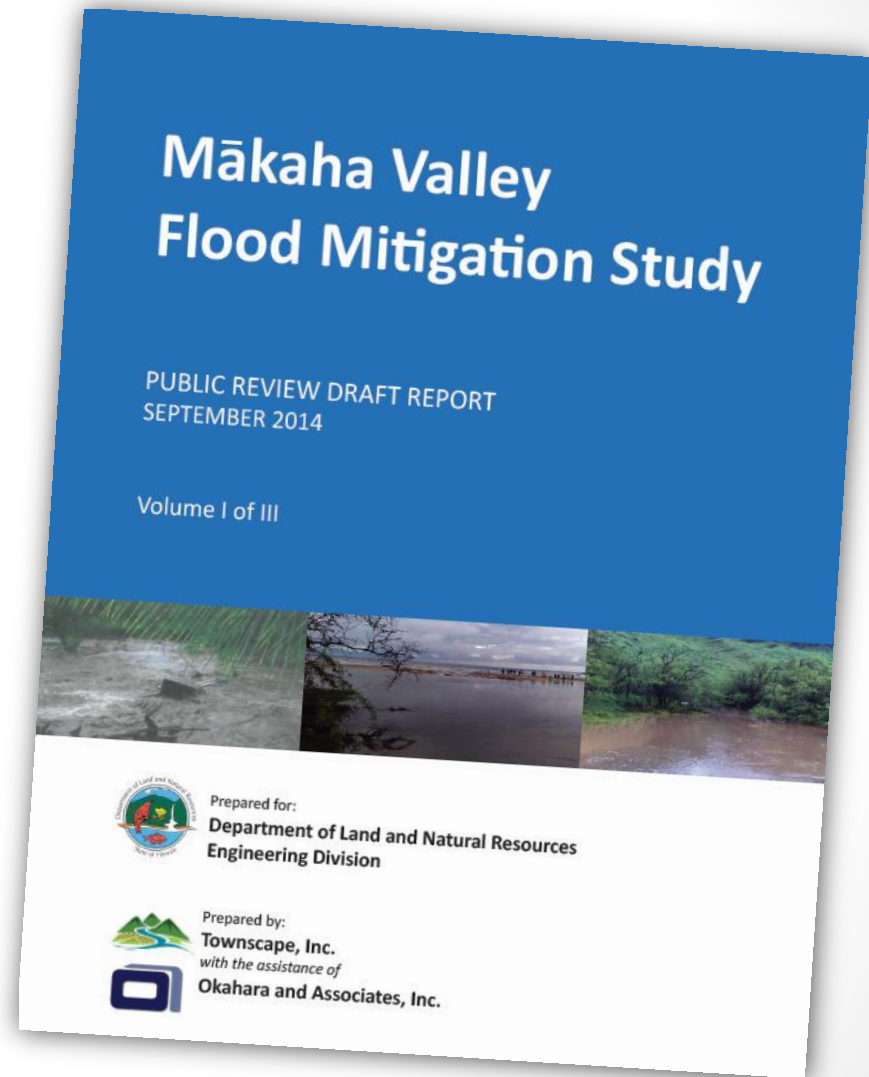
High	Medium	Low
<ul style="list-style-type: none">• Repair the breach in the Mākaha Stream berm• Restore Mākaha Surfing Beach “Pond”	<ul style="list-style-type: none">• Eku Stream Channel and Off-line Detention Basin	<ul style="list-style-type: none">• Kili Drive Channel• Mākaha Stream Levee• Noholio Road Drain Line• In-stream Detention Basins for Mākaha Stream• New Eku Stream Bridge at Farrington Highway

Implementation of the Mākaha Valley Flood Study

- Difficulties with implementation:
 - Privately-owned land
 - Significant capital funds needed
 - Ongoing maintenance of projects
- Challenges:
 - Identify funding sources for projects
 - Identify entity that will own and maintain improvements

Next Steps

- **December 2014:**
FINAL Report
- **January 2015:**
3rd Community Meeting



Thank you for your
attention.

Questions?



Contact Information:



TOWNSCAPE, INC.
Environmental & Community Planning

Bruce Tsuchida

808-536-6999

bruce@townscapeinc.com

Gabrielle Sham

808-536-6999

gabrielle@townscapeinc.com